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Compare *Marsilea* and *Isoetes* with *Pteris*. Do they differ as to growth, branching and leaf arrangement? Which has the highest type of leaf and stem? Has each the homologue of the sorus, indusium, sporangium and annulus? Are the sporangia situated as in Pteris? Is the arrangement of the two kinds of spores the same in both genera?

How many hours will that take? And how many, the comparison of Equisetum with Pteris, requiring eight microscopical preparations (of which five are sections) besides observation of the external anatomy? That such directions may be useful we readily concede; but that anywhere they can be carried out in 300 hours, or 600, we must seriously doubt.

It goes without saying that one in Dr. Curtis' position, with adequate facilities at his command, is capable of enumerating the chief facts of botany when he sets about it; accordingly we find in this book a fairly accurate and up-to-date account of plant structure and phenomena. The facts are made coherent by a thread of philosophical theory which stimulates thought on the part of the student and leaves him with an open mind. The book may therefore serve a good purpose as a reference book in laboratories, particularly as it is well illustrated by new figures.

A most important consideration in a work for beginners is the presentation of the subject. As to manner, this is somewhat unfortunate. Dr. Curtis' English syntax is not above reproach, and his use of words is frequently inelegant or even incorrect. As to matter, it may be questioned whether histology is well adapted for introducing the beginner to the science of botany. What advantage has it over "analysis" which we all decry? Ought not the student's first impression of the plant rather be of an *organism*, capable of *doing* something? Has he at the outset any knowledge which can illuminate the details of histology and make them interesting and intelligible? If it be replied that the student must know structure before he can understand function, it is granted; yet his knowledge of structure must not be deadened by study of detail, it must be vivified study of action.

Through these considerations we are led to the conclusion that the book before us is a convenient compendium of the well-known facts of botany and a laboratory guide with useful suggestions as to illustrative material. In these things it is no better than its predecessors; and this, together with some faults in plan and execution deprive it of a valid *raison d'être*.—C. R. B.

A manual of botany.[2]

THE first edition of this valuable manual appeared in 1895, being intended to take the place of Bentley's *Manual*. In fact, it was the original intention to

[2] GREEN, J. REYNOLDS.: A manual of botany. In two volumes, 2d edition. Vol. I. Morphology and Anatomy, xii + 406. *7s 6d*. Vol. II. Classification and Physiology, xi + 541. *10s*. J. & A. Churchill: London. 1897.

make it the sixth edition of that work. The necessity for a second edition in two years speaks well for its usefulness. It is well named a "manual," making no claims as a text-book prepared for any special class of students. In an orderly and very clear way it presents the main facts of the subject, in many parts largely partaking of the dictionary style, which is allowable in a manual. The part which treats of morphology bears the most ancient stamp, being simply Bentley's presentation modified sufficiently to include newer views. In the second edition this is still further revised. The part which treats of classification (407 pages) follows the usual method of treating the thallophytes, bryophytes, and pteridophytes from the morphological standpoint as the basis of a rational classification, and the spermatophytes from an entirely different standpoint. This unfortunate group is presented with its usual dreary list of cohorts, orders, etc., entirely unreadable, and suited only to a strictly taxonomic work. Mr. Green, however, is but following the usual custom.

In the parts devoted to anatomy and physiology, however, the author appears at his best, for he is in his own field, and one can recognize the touch which has come from personal contact. It seems to us that the chapters on physiology give us the best brief presentation of that great subject which we have met. Compressed as it is into 116 pages out of a total of 947 it is surely entirely out of all proportion. Gladly would we have contributed to its fuller expansion the 220 pages (!) of Benthamian cohorts and orders. We can do little more than give the titles of the chapters which deal with physiology, but even the titles are very suggestive of the treatment. They are as follows: The relation of water to the protoplasm of the cell, the transport of the water in the plant, the skeleton of the plant, the transpiration current (with root pressure and transpiration), the food of plants, the absorption of food materials by a green plant, the chloroplastids and their function, reserve materials, the catabolic processes, the respiration of plants, growth, influence of the environment on plants, the relation of the plant to its environment (with irritability), special sensitiveness and its results, the nervous mechanism of plants, automatism (with rhythm), reproduction.—J. M. C.

Botanical notebook.[3]

THE second edition of this little book has been entirely rewritten, and gives us a good glimpse of the botanical instruction at Brown University.[1] It treats of plants in much the same way as they are presented in Gray's text-books, namely, the gross morphology of spermatophytes. For those

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[3] BAILEY, W. W.—Botanical notebook, a synopsis of lectures and laboratory plans in general morphology and systematic botany for use in classes in Brown University. Second revised edition. 8vo. pp. xi + 120. Preston & Rounds Co.: Providence. 1897.